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PATENT

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Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): James R. Harte

For: EMPTY PACKAGE DETECTOR FOR LABELING APPARATUS

I hereby certify that this document and any being referred to as attached or enclosed is being deposited with the United States Postal Service as Express Mail in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231 on this date:

4/21/00 Paula L. Simmons
Date Paula L. Simmons

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Enclosed are:

- ☒ 14 pages of specification, 10 claims and an abstract.
- ☒ an executed oath or declaration, with power of attorney.
- ☐ an unexecuted oath or declaration, with power of attorney.
- ☒ 7 sheet(s) of informal drawing(s).
- ☐ __ sheet(s) of formal drawings(s).
- ☒ Assignment(s) of the invention to Koch Supplies Inc. .
- ☒ Assignment Form Cover Sheet.
- ☒ A check in the amount of $40.00 to cover the fee for recording the assignment(s) is enclosed.
- ☐ Associate power of attorney.

Fee Calculation For Claims As Filed

a) Basic Fee						$	690.00
b) Independent Claims	3 - 3 =	0	X	$78.00	=	$	0.00
c) Total Claims	10 - 20 =	0	X	$18.00	=	$	0.00
d) Fee for Multiple Claims			X	$260.00	=	$	0.00
				Total Filing Fee		$	690.00

- ☒ **1 Statement(s) of Status as Small Entity, reducing Filing Fee by half to $ 345.00**
- ☒ A check in the amount of $345.00 to cover the filing fee is enclosed.
- ☐ Other _____.
- ☒ The Commissioner is hereby authorized to charge any additional fees which may be required to this application under 37 C.F.R. §§1.16-1.17, or credit any overpayment, to Deposit Account No. 50-1126. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-1126. Two duplicate copies of this sheet are enclosed.

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Applicant or Patentee: James R. Harte Attorney Docket No: 70011940.06
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For: EMPTY PACKAGE DETECTOR FOR LABELING APPARATUS

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) AND 1.27(c) - SMALL BUSINESS CONCERN)

I hereby declare that I am
☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: Koch Supplies Inc.
ADDRESS OF CONCERN: 1414 W. 29th Street, Kansas City, Missouri 64108 USA

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time, or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled:

EMPTY PACKAGE DETECTOR FOR LABELING APPARATUS

by inventor(s): James R. Harte

described in:
☒ the specification filed herewith.
☐ Application Serial No.: _____, filed _____
☐ Patent No.: _____, issued _____

If the rights held by the above-identified small business concern are not exclusive, each individual, concern, or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).
*NOTE: Separate verified statements are required from each named person, concern, or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME _____
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☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: John Starr
TITLE OF PERSON OTHER THAN OWNER: President
ADDRESS OF PERSON SIGNING: 1411 W. 29th Street, Kansas City, Missouri 64108
SIGNATURE: _____ DATE: 20 APR 2004

EMPTY PACKAGE DETECTOR FOR LABELING APPARATUS

Field of the Invention

This invention relates to a method and apparatus for detecting empty or absent packages on a packaging machine system to prevent the dispensing of labels on empty or absent packages. In particular, the method and apparatus comprises a labeling apparatus having proximity sensors mounted thereto to detect empty or absent packages and to communicate such information to the labeling dispenser to prevent the unnecessary dispensing of labels.

Background of the Invention

In a variety of food and medical packaging operations, a packaging system is utilized commonly referred to as a horizontal form, fill, and seal packaging machine. These systems index in a start and stop type operation and package an array of products each cycle.

And such as operations where a food product is packaged, it is desirable to place labels on the packages. The packager may place the labels manually on the packaging film before the package is filled with product or after the article is packaged. Manual label placement is costly and slow. Thus, packagers have found automated apparatus useful in placing labels on the packaging.

Typically, labels are either (1) placed on packaging film that is then later used to package an article or (2) placed directly on the packaged article. An example of a device that places labels directly on packaging film is described in Harte et al. U.S. Patent No. 5,725,717. An example of a device that places labels directly on the packaged article is found in Wurz et al., U.S. Patent No. 5,954,913.

To accelerate the process of placing the labels on the packaging film or the packaged articles, labeling devices are designed to place labels on an array of packages or place several labels across the width of the packaging film. In these devices, the labeling apparatus is perpendicular to the movement of the film or the packaged articles (as illustrated by Fig. 1 and

U.S. Patent No. 5,725,717). Such labeling devices can be designed to apply labels to package arrays varying from a minimum of one row by two tracks, to twenty-four rows by twenty-four tracks, and possibly more.

Labelers designed to place labels on an array of packages will dispense the labels across the index of the packaging machine. The labels are dispensed across a transport unit that extends outward and perpendicular to the packaging machine system. The transport unit spaces the labels appropriately to align the labels with the tracks of the packaging machine system, such that the labels can be placed directly on the packaged articles on the tracks of such system.

To place the labels on these packages, the transport unit has tamping plates that press the labels on the packaged articles. Even when a package is empty, the labeler will place the label on the empty package, thereby wasting labels.

Labeling machines of this type may be mounted upright labeling the top of the package or in an inverted position underneath the packaging machine labeling the bottom of the product. The label machine typically holds the loose labels against a transport unit through vacuum. The transport unit transports and aligns the labels across the row of articles. When a package in the array is empty and the labeling machine is inverted, the labeler would normally attempt to label the entire array but the empty package in the array is generally collapsed and will not accept the label. Then the labels drops back onto the labeling machine which eventually will jam the labeling machine and require the entire line to be stopped to remove loose labels.

Accordingly, there is a need for a method and apparatus that detects when a container is empty or when an article is absent and communicates such information to the labeling apparatus to prevent the labeling apparatus from unnecessarily dispensing labels.

Summary of the Invention

Accordingly, the principle object of the present invention is to provide a method and apparatus for communicating with a labeling machine such that the labeling machine will only dispense and place labels on packaged articles and will not dispense labels onto empty packages or packages missing from the stream of packaged articles.

In the present invention, sensors are positioned in front of the labeling transporter, which positions the labels on the packaged articles. These sensors are preferably positioned directly in front of the transporter over the row of articles preceding the transporter and operate to detect the presence and absence of packaged articles and their content. Thus, if a package is absent from a row or does not contain product, the sensors can alert the labeling machine so that the labeler does not dispense a label for that missing article or empty package.

The present invention utilizes capacitive sensors, such as those sold by Turck, Inc., and is designed primarily for use in connection with articles packaged in packaging film, such as food products. When used with other types of packaging film, capacitive sensors would likely only detect the complete absence of a package and not empty packages. While detecting the absence of a package still provides an advantage to typical array labelers, the full advantages of the present invention are not recognized when used with other types of packaging film. Sensors, however, are designed to detect a wide-variety of items. Thus, one skilled in the art may be easily able to vary the type of sensors used in connection with the present invention to allow the detection of the absence of content packaged in different types of packaging material.

The present invention and other objects, advantages and variations thereof will be clarified in the following description of the preferred embodiment in connection with the

drawings, the disclosure and the appended claims, wherein like reference numerals represent like elements throughout.

Description of the Drawings

FIG. 1 is a perspective view of a labeling machine mounted on a packaging machine system and having proximity sensors attached thereto for detecting empty packages and absent articles.

FIG. 2 is a perspective view of a labeling machine having proximity sensors attached thereto.

FIG. 3 is a bottom view of the labeling machine with proximity sensors illustrated in FIG. 2.

FIG. 4 is a plan view of the labeling machine with proximity sensors illustrated in FIG. 2.

FIG. 5 is a top view of the labeling machine with proximity sensors illustrated in FIG. 2.

FIG. 6 is a side view of the labeling machine with proximity sensors illustrated in FIG. 2.

FIG. 7 is a flow chart of the preferred process for controlling the operation of the labeling machine when used to apply labels in accordance with the present invention.

Description of the Preferred Embodiment

As seen in Figure 1, the present invention, in general terms, comprises a labeling machine 20 (also referred to herein as a "labeler") having proximity sensors 60 mounted thereon for communicating to the labeling machine 20 either (1) the presence of an empty package 10 or (2) the absence of a package 10 expected to be present for labeling. The labeling machine 20 utilized in the present invention and shown in the attached Figures is known in the art. The particular machine 20 illustrated in the Figures is sold by Koch Supplies as the Crossweb™ Package Labeler. Although other labeling machines 20 can be adapted for use with the proximity sensors 60 described herein, the preferred embodiment utilizes the Koch Crossweb™ Package Labeler.

Additionally, while the present invention can use an in-line labeler, i.e., single article labeler 20, the present invention is more advantageous when used in connection with web labelers, or labelers 20 that are designed to place labels 30 on an array of packages 10, as illustrated in Figure 1. Furthermore, the present invention can be used in connection with both upright and inverted machines 20, the upright machines 20 place labels on the top of the packages 10 while the inverted machines 20 place labels on the underside of the packages 10.

To fully understand the scope and nature of the present invention, one must first appreciate the operation of a web labeler 20, such as the Koch Crossweb™ Package Labeler. A typical web labeler 20 is positioned perpendicular to the movement of the articles 10 and extends either above or beneath the packaged articles 10, depending upon the positioning of the web labeler 20.

A typical labeler 20 includes a label dispensing mechanism 22 and a label transport and tamping mechanism 24 (also referred to herein as a "transporter"), each driven by a stepper

motor (not shown) and a control unit (not shown). In the present invention, each mechanism 22 and 24 is controlled by a separate microprocessor, in a master-slave operation, with the label transport and tamping mechanism 24 operating as the master and the label dispensing mechanism 22 operating as a slave. Thus, the label transport mechanism 24 calls the label dispensing mechanism 22 when the transport mechanism 24 needs a label 30.

Optionally, the labeler 20 may also include a shifting unit 26 that moves the label transport 24 and dispensing mechanism 22 forward with each cycle of operation. Like the label dispensing mechanism 22, the shifting unit 26 is also driven by a step motor, controlled by its own microprocessor and operates as a slave, being called by the microprocessor of the label transport and tamping mechanism 24.

The label transport 24 includes a belt (not shown) through which a vacuum force is applied. The belt receives a series of labels 30, at predetermined positions along the belt, from the label dispensing mechanism 22 and holds the non-adhesive side of the labels 30 against the belt using the vacuum force. The belt then positions the labels 30 over a corresponding row of articles 10 and a tamper bar 48 then removes the labels 30 from the belt and places the labels 30 on the row of articles 10. The packaging machine then either moves the next row of articles 10 under the label transport 24 or the shifting unit 26 positions the label transport 24 over the next row of articles 10 as it dispenses a new series of labels 30.

As seen in Figure 1, the label dispensing mechanism 22 contains a label roll 34 and a dancer 36 that applies tension to the label web 28, i.e., the plurality of labels 30 with the adhesive side of the labels 30 placed against a web backing 32. The label web 28 is then fed around rollers 38. A stepper motor, or other like motor, pulls the labels 30 around a peelbar 40 to dispense the labels 30 onto the label transport and tamping mechanism 24. The web backing 32,

after the labels have been removed, is then delivered to a take-up roller 38 that applies tension to the label web backing 32.

To assist in transferring the labels 30 to the transport and tamping mechanism 24, the labeler dispensing mechanism 22 also comprises a peelbar 40 and label scanner 42 for sensing the edges of the labels 30 and determining the width of the labels 30. The peelbar 40 is mounted on the label dispensing mechanism 22 at the interface between the label dispensing mechanism 22 and the label transport and tamping mechanism 24. The peelbar 40 includes an edged surface 39 at which the labels 30 are separated from the backing web 32 by the backing web 32 being pulled around the edged surface 39 by the step motor.

Sensors (now shown) on the label scanner 42 are used to detect the leading edge of the label 30. Based upon the position of the leading edge of the label 30, the system adjusts the speed of the label web 28 by controlling the step motor that drives the label dispensing mechanism 22.

The label dispensing mechanism 22 also preferably includes an airstream device (not shown) for assisting the transfer of the label 30 onto the label transport mechanism 24. The airstream device may create a short pulse of air at the desired time, or provide a continuous airstream to assist with the transfer of the label 30 onto the belt of the label transport 24.

As discussed above and illustrated in Figures 2-6, the label transport and tamping mechanism 24 interfaces with the label dispensing mechanism 22 to receive the labels 30 from the label web 28. The label transport 24 receives the labels 30 from the edge surface 39 of the peel bar 40. The label transport and tamping mechanism 24 is driven by a step motor, controlled by a microprocessor and operates as the master of the labeler 20. The label transport and tamping mechanism 24 comprises several rotating vacuum belts around a roller 38. The belts

being evenly spaced apart with tamper blades 48 positioned between the belts for removing the labels 30 from the belts. Within the label transport 24 is a vacuum belt for applying vacuum force through the belt. The vacuum belts include a plurality of holes through which a vacuum force is applied.

By using sensors on the label scanner 42 and the appropriate pre-programmed variables, the label transport 24 is able to determine the correct positioning of the labels 30 on the vacuum belts such that the labels 30 can be positioned at the appropriate positions over the packaged articles 10. Based upon the information from the sensors on the label scanner 42 and the pre-programmed variables, the label transport 24 is programmed to know the placement of each label 30 on the transport belt, the width of each label 30, the amount of space between each label 30 and the number of labels to be dispensed per row. Thus, based on these conditions, the label transport 24 is able to calculate the move profiles of the transport belt in order to place the labels 30 on the belt at the appropriate locations.

The label transport executes a series of discrete moves to transfer the label 30 on to the transport belt and to create the appropriate spacing between the label 30. The belt decelerates to receive labels 30 and then accelerates to create the proper spacing between the labels 30. Without the use of the proximity sensors 60, as further described below, labeling machines 20, similar to the Koch Crossweb™ Package Labeler, are programmed to dispense labels at appropriate spacing, without regard to whether a packaged article 10 is in fact present or whether the package 10 is empty. While the in-line labelers do prevent the labeling of missing packages, the in-line labelers do not prevent the labeling of empty packages and thus, the present invention, while primarily designed for array systems, adds some advantage to in-line operations.

In the present invention, sensors 60 are positioned in front of the label transport 24, preferably directly in front of the transporter 24 and over the row preceding the transporter 24 (as seen in the attached Figures), to detect the presence and absence of packaged articles 10 and their content. Thus, if a package 10 is absent from a stream of articles or does not contain product, the sensors 60 can alert the labeler 20 so that the labeler 20 does not dispense a label 30 for that missing article 10 or empty package 10.

For example, in a typical array packaging system, such as the system shown in Figure 1, each row of packaging contains four articles 10. These articles 10 can be advanced toward the labeler 20 one row at a time or can advance in two or more rows at a time, in which case the shifting unit 26 is utilized to advance the labeler 20 forward to the next row until the packaging machine system advances the next set of rows to the labelers' 20 home position. When the next set of rows is advanced, the shifting unit 26 would then return the labeler 20 to its home position to dispense labels 30 on the first row of articles 10 in that set.

To sense the presence or absence of an article 10, or an empty package 10, the present invention must have one sensor 60 for each article 10 in a row. Each sensor 60 is placed in front of the label transport 24, or upstream from the row being labeled by the transport 24, and must be positioned over the area where the respective article 10 in each row is expected to be traveling. Thus, for a row containing four articles 10, the label transport 24 must have four sensors 60 placed in front of the label transport 24 over the area where the four articles 10 are expected to travel.

The sensors 60 of the present invention are preferably placed over the top of the area where the articles 10 are to travel, or when the labeler 20 is inverted, the sensors 60 may be placed underneath the area where the articles 10 are to travel. Since the present invention is

primarily designed for use in connection with articles 10 packaged in packaging film, the present invention employs capacitive sensors 60 that detect moisture, such as those sensors sold by Turck, Inc. Inductive sensors and the like may also be used in the present invention. Those skilled in the art will also appreciate that in labeling applications, where the packages are not wrapped in packaging film, other types of sensors may be used to accomplish the same advantages as those taught by the present invention for articles packaged in packaging film.

The sensors 60 of the present invention will produce signals, or become excited, when packaged articles 10 are positioned underneath the sensors 60. The capacitive sensors 60 detect the weak conductivity in the product due to moisture. Since the present application is designed primarily for use in connection with packaging food articles 10, the sensors 60 will detect the moisture contained in the food articles. Thus, when a food article 10 is absent, a sensor 60 will not signal the presence of a packaged article 10. This means that if a package 10 is absent or a package 10 is empty, the sensor 60 will not signal or become excited.

Since the sensors 60 are placed at least one row ahead of the row being labeled, the labeler 20 can call for a snapshot of the signals being given by the sensors 60 as they relate to the preceding row of articles 10. This snap-shot is taken before the labeler 20 advances over the relevant articles 10 and is stored into memory as a series of binary digits, i.e., a status byte. If a sensor 60 detects a package article 10, i.e., becomes excited, the sensor 60 was excited, a 1 will be stored into memory for that sensor 60, in a position in the series of bits that corresponds to the position of the sensor 60. In contrast, if a sensor 60 is not excited, meaning that the corresponding package 10 was either empty or absent, a 0 will be stored into memory in the position holder for that sensor 60.

Thus, if a snapshot of a row of four articles 10 is being taken, four bytes will be stored into memory relating to those four articles. If the representative status byte taken from a snapshot reads 1101, one knows that the third package 10 in the row contains either an empty package or the package is missing. The first bit in the status byte will correspond to the positioning of the first article 10 in the row to be labeled, which is the first label 30 to be dispensed. The labeler 20 can then take this information and use it to determine when and when not to call for a label 30 to be dispensed.

As illustrated by the flow chart in Figure 7, in operation, the labeler 20 is first powered on (step 62), and, based upon the parameters input by the user, such as labels 30 per row, row distance, and row spread, and those measured by the label scanner 42, the labeler 20 will determine where to position the labels 30 on the label transport belt and the spacing between the labels 30. Based on these initial parameters, the labeler 20 will dispense the first row of labels 30 (step 64) and place the labels 30 on the packaged articles 10 positioned directly underneath the labeler 20, using the tamper blades 48 (step 66). A snapshot of the sensors 60 positioned over the preceding row (step 68), as described above, is then taken, which produces a status byte representing the packaged articles 10 in the preceding row. The label transport 24 is then either moved, via the shifting unit 26 over to the preceding row, or the packaging machine system moves the articles 10 to position them underneath the label transport 24 (step 70). The label transport 24 then moves the belt in position to receive the first label (step 72). The label transport 24 then sets an I/O bit high to call for the label dispenser 22 to dispense the first label 30 (step 74). In the present invention, the I/O bit is set to a 1 when it is set high. Prompted by this call, the label transport 24 then performs an internal AND compare function on the first bit

of the status byte retrieved from the snapshot of the row of articles now positioned below the label transport 24.

The transport 24 now begins moving the belt the first label distance. If the sensor 60 indicated the presence of an article 10, which would return the AND compare function as (1 AND 1 = 1), then the signal is fed to the label dispenser 22 to dispense a label 30 (steps 76 and 78). If the sensor 60 did not indicate the presence of an article 10, which would return the AND compare function as (1 AND 0 = 0), then no signal is fed to the label dispenser 22 (step 80). The transport 24 will then move the belt the space of the label 30 (step 82), regardless of whether a label 30 is dispensed. If there are more labels to be dispensed for that row (step 84), the transport 24 now advances the belt creating a space between the labels 30 (step 72), performs a right shift on the status byte which brings the status of the second sensor 60 into the least significant bit and starts the process all over again with setting the I/O bit high to initiate the next call for a label 30 from the label dispenser 22 (step 84).

Thus, the process of setting the I/O bit high to call for a label 30 from the label dispenser 22, performing the internal AND compare function, and determining whether to send the call to the dispenser 22, is repeated over and over again for each label 30 in the row. After the call for the last label 30 in the row (step 84), the label dispenser 24 then labels the product for that row using the tamper blades 48 (step 66) and calls for a snapshot of the preceding row (step 68), the labeler 20 advances to that row (or the packaging machine advances to align the articles 10 underneath the labeler 20) (step 70) and the call process begins again with a new status byte of information for the row beneath the label transport 24 (step 74).

Although the foregoing detailed description of the present invention has been described by reference to a single exemplary embodiment, and the best mode contemplated for carrying out

the present invention has been herein shown and described, it will be understood that modifications or variations in the structure and arrangement of this embodiment other than those specifically set forth herein may be achieved by those skilled in the art and that such modifications are to be considered as being within the overall scope of the present invention.

For example, as previously discussed, this invention can be used in a variety of labeling applications by modifying the type of sensors 60 used in connection with the labeling machine 20. Likewise, in the present invention the sensors 60 are mounted to the labeler 20 or positioned one row preceding the rows being labeled. The sensors 60 may, however, be positioned more than one row ahead of the labeler 20, making the status byte string longer. Furthermore, the number of sensors 60 used in the present invention will correspond to the number the articles 10 per row. Depending on the intelligence and memory capacity of each machine 20, the maximum amount of sensors 60 that can be used may vary and will be dictated by each particular labeling machine 20. Finally, the present invention teaches that when no label 30 is dispensed, the label transport 24 first moves the distance of the label 30 and then moves to create a space between the labels 30 – a two-step process. The labeler 20 could alternatively be programmed such that if a label 30 is not dispensed, the labeler 20 will move the distance of the label 30 and the space between the label 30 in one movement, rather than maintaining a constant speed for the dispensing of the label 30 then accelerating to create the space between the labels 30.

As briefly described above, modifications other than those specifically set forth herein may be achieved by those skilled in the art. Such modifications are to be considered as being within the overall scope of the present invention. It is contemplated that the present invention shall cover any and all modifications, variations, or equivalents that fall within the true spirit and

scope of the underlying principles disclosed and claimed herein. Consequently, the scope of the present invention is intended to be limited only by the attached claims.

CLAIMS

We claim:

1. A labeling machine having the ability to detect the presence of an empty package or the absence of a package on a packaging machine system, said labeling machine comprising at least one proximity sensor placed in front of the labeling machine to detect the presence of an empty package or the absence of a package on a packaging machine prior to the empty package or empty space on the packaging machine reaching the labeling machine and to communicate such information to the labeling machine such that the labeling machine will not dispense a label for an empty package or absent package on the packaging machine system.

2. A labeling machine recited in claim 1, wherein the labeling machine is designed to place labels on an array of packages on a multiple track packaging machine.

3. A labeling machine recited in claim 2, having at least one proximity sensor positioned over each track of the multiple track packaging machine.

4. A labeling machine recited in claim 1, wherein said sensors are capacitive proximity sensors.

5. A labeling machine recited in claim 1, wherein said sensors detect the conductivity in the product due to moisture contained in the product to be packaged.

6. A labeling machine recited in claim 1, wherein said sensors are placed at least one row ahead of the row being labeled.

7. A method for detecting an empty package or the absence of a package on a packaging machine system to prevent the unnecessary dispensing of labels onto empty or absent packages, said method comprising the steps of:

placing at least one sensor in front of a labeling machine to detect the presence of an empty package or absence of a package on a packaging machine system,

the sensor communicating the detection of an empty package or absence of a package to the labeling machine;

the labeling machine reading such communication and preventing the dispensing of a label for a package when a sensor has detected that such package for which the label is to be dispensed is either an empty or absent package.

8. A method for detecting an empty package or the absence of a package on a packaging machine system as recited in claim 7, wherein said method further includes placing at least one sensor over each track of a packaging machine system when utilizing a labeling machine for labeling an array of packages.

9. A method for detecting an empty package or the absence of a package on the packaging machine system as recited in claim 7, further comprising the step of communicating the information detected by the sensors with respect to each package in an array of packages to the labeling machine in the order that the labeling machine dispenses the labels for such packages on the tracks of the packaging machine.

10. An method for detecting an empty package or the absence of a package on a packaging machine system to prevent the unnecessary dispensing of labels onto empty or absent packages, said method comprising the steps of:

placing proximity sensors at least one row ahead of the row being labeled by a labeling machine designed to label an array of packages;

the labeler calling for a snap-shot of the signals being given by the sensors as they relate to the proceeding row of articles;

storing said snap-shot of signals as a series of bits corresponding to the positioning of each sensor;

the labeler reading the series of bit information when dispensing the row of labels that corresponds to the row of articles for which the information was taken and dispensing labels only when such sensors detect the presence of a package filled with product.

EMPTY PACKAGE DETECTOR FOR LABELING APPARATUS

Abstract

A method and apparatus for communicating with a multiple lane labeling machine such that the labeling machine will only dispense and place labels on packaged articles. The present invention comprises a labeling machine having sensors positioned in front of the label transport, which positions the labels on the packaged articles. These sensors are preferably positioned directly in front of the label transport over the row of articles preceding the transporter and operate to detect the presence and absence of packaged articles and their content. Thus, if a package is absent from a row or does not contain product the sensors alert the labeling machine of the absence of an article so that the labeler does not dispense a label for a missing article or empty package.

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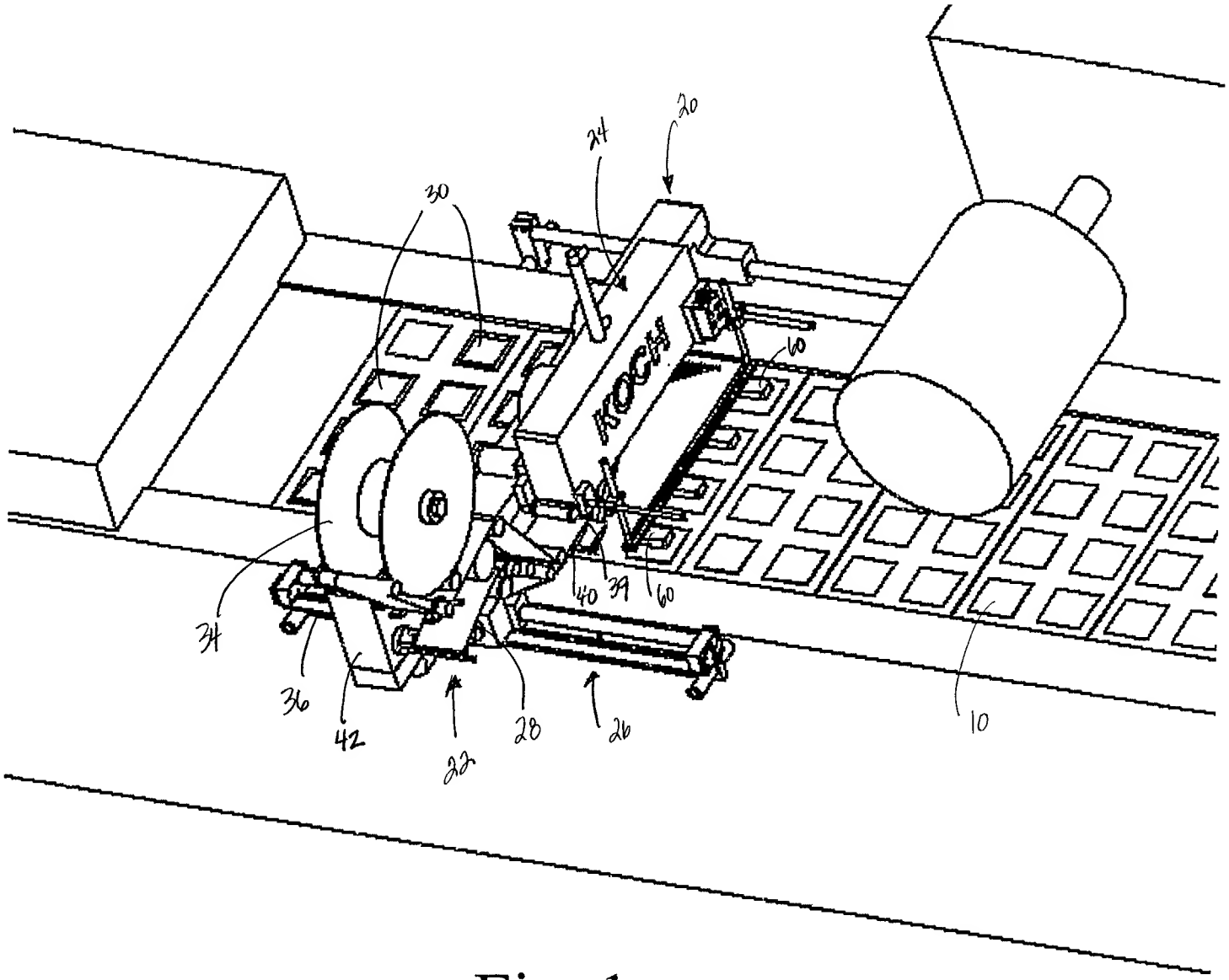

Fig. 1

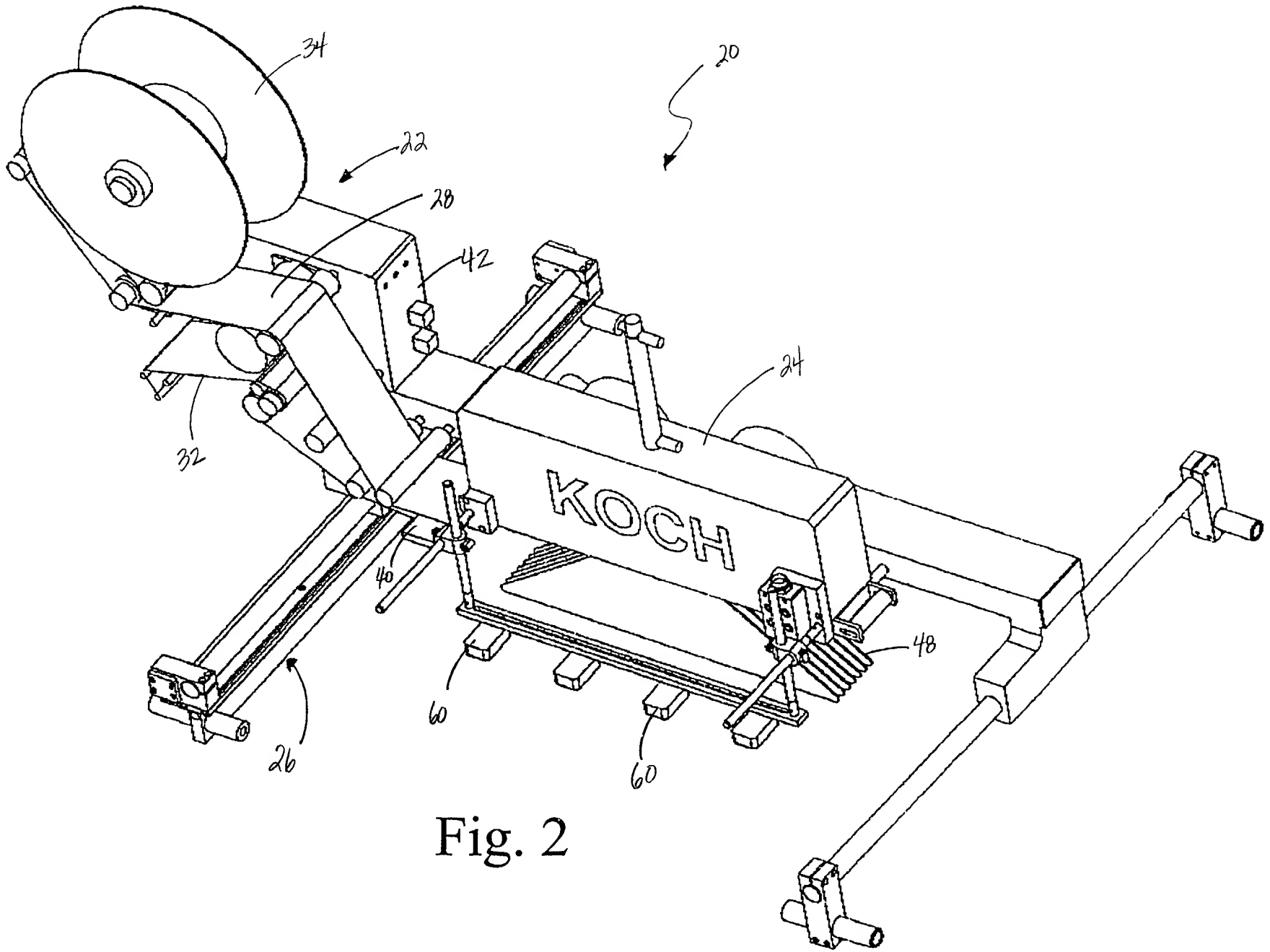

Fig. 2

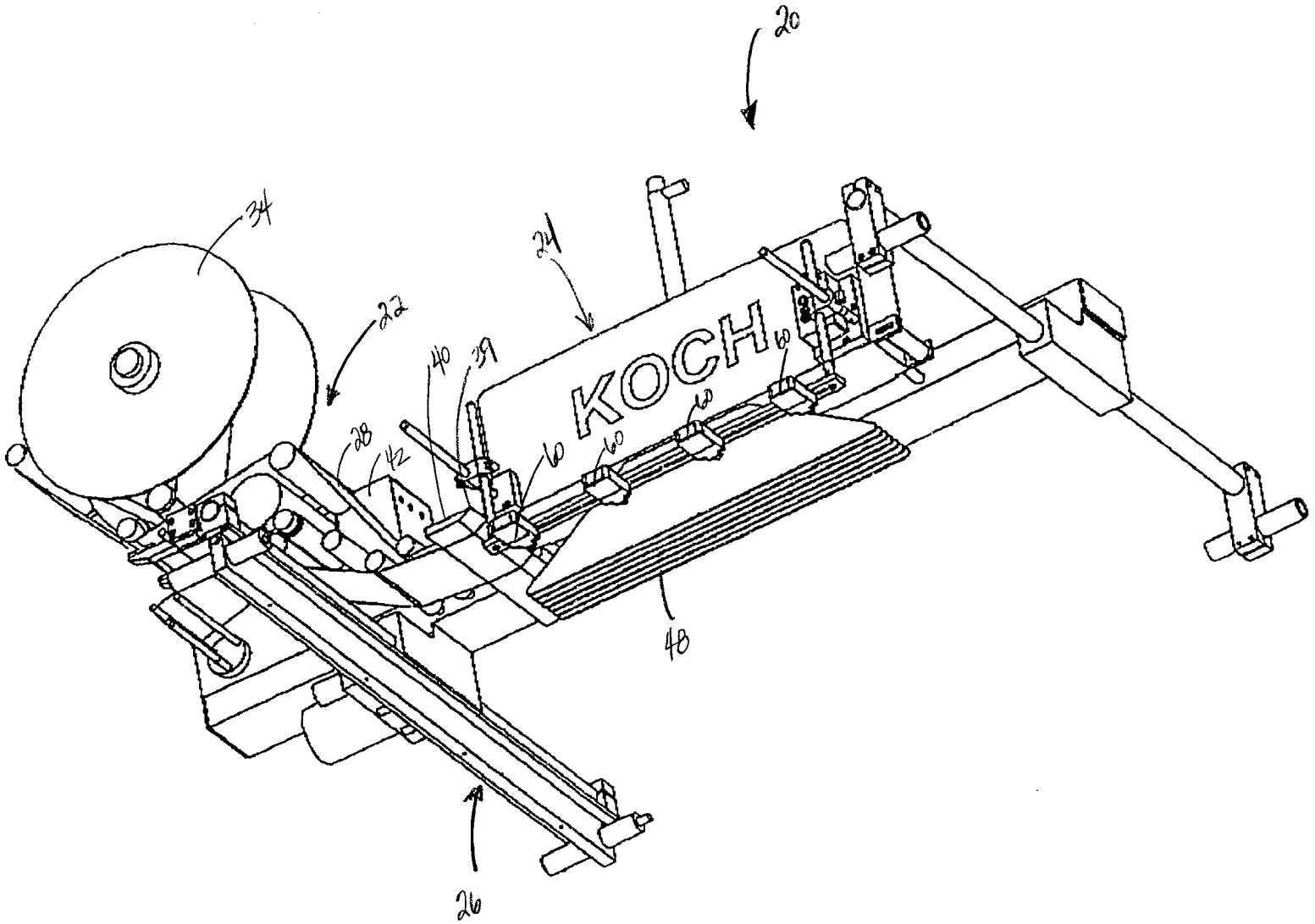

Fig. 3

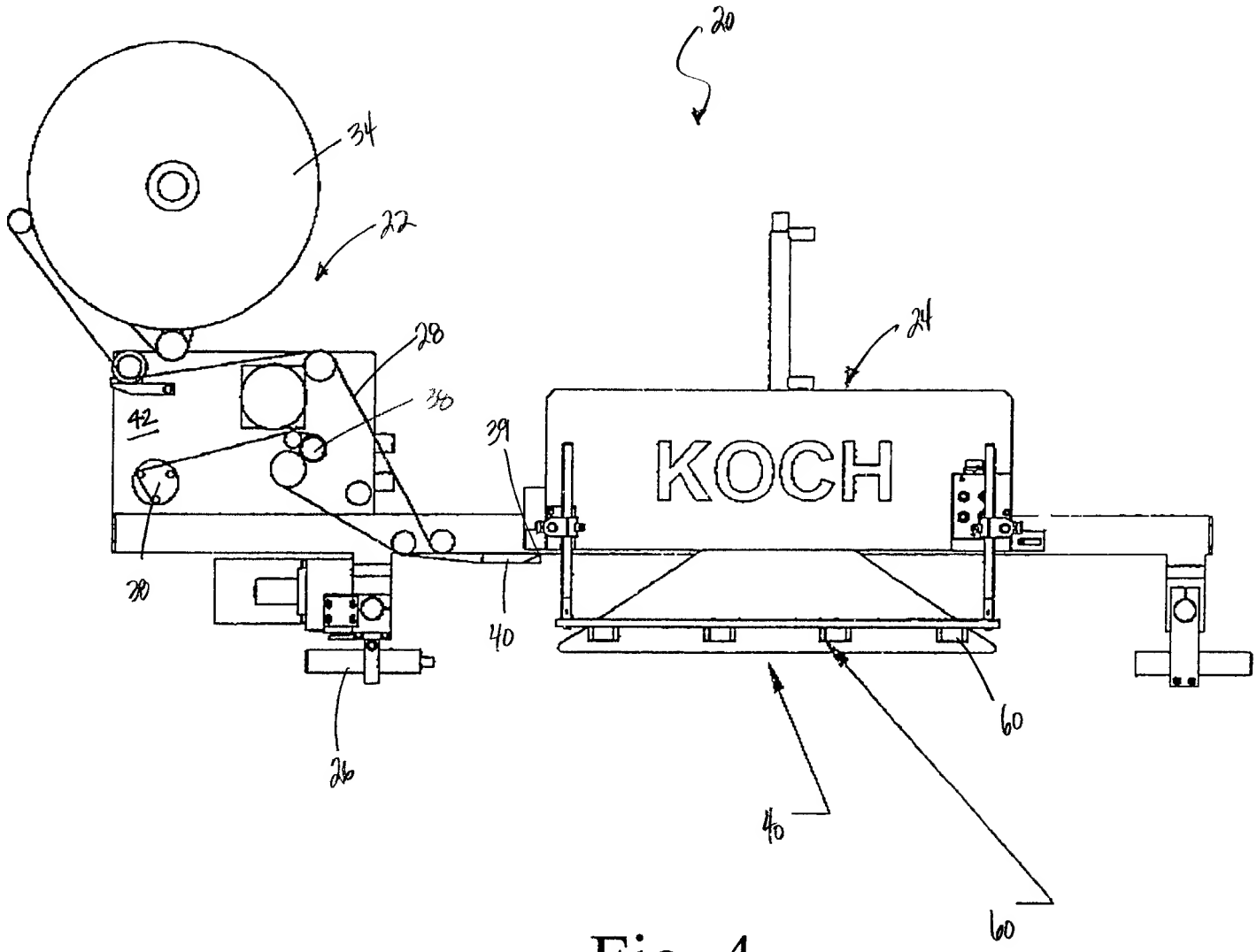

Fig. 4

09538937 "0124"

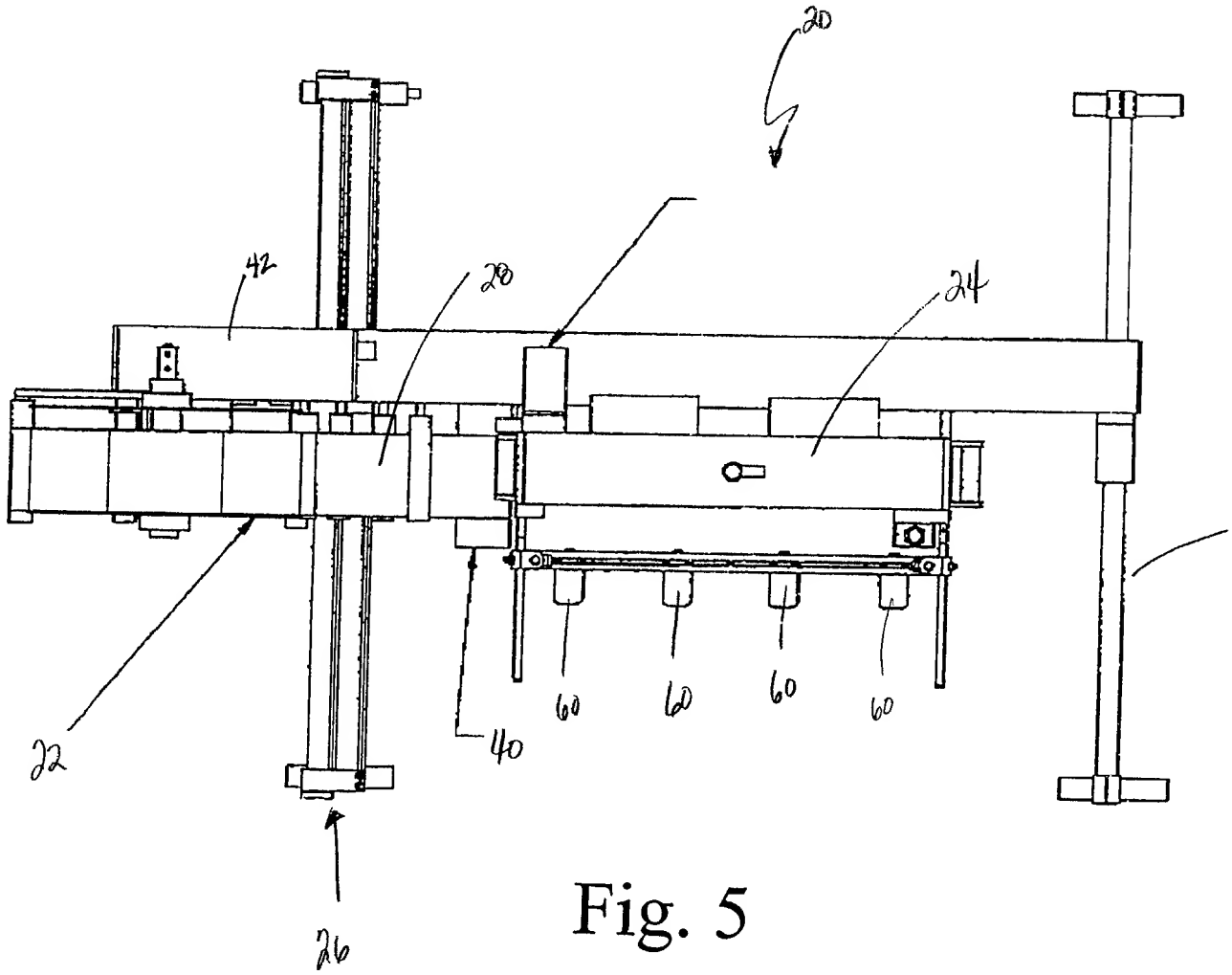

Fig. 5

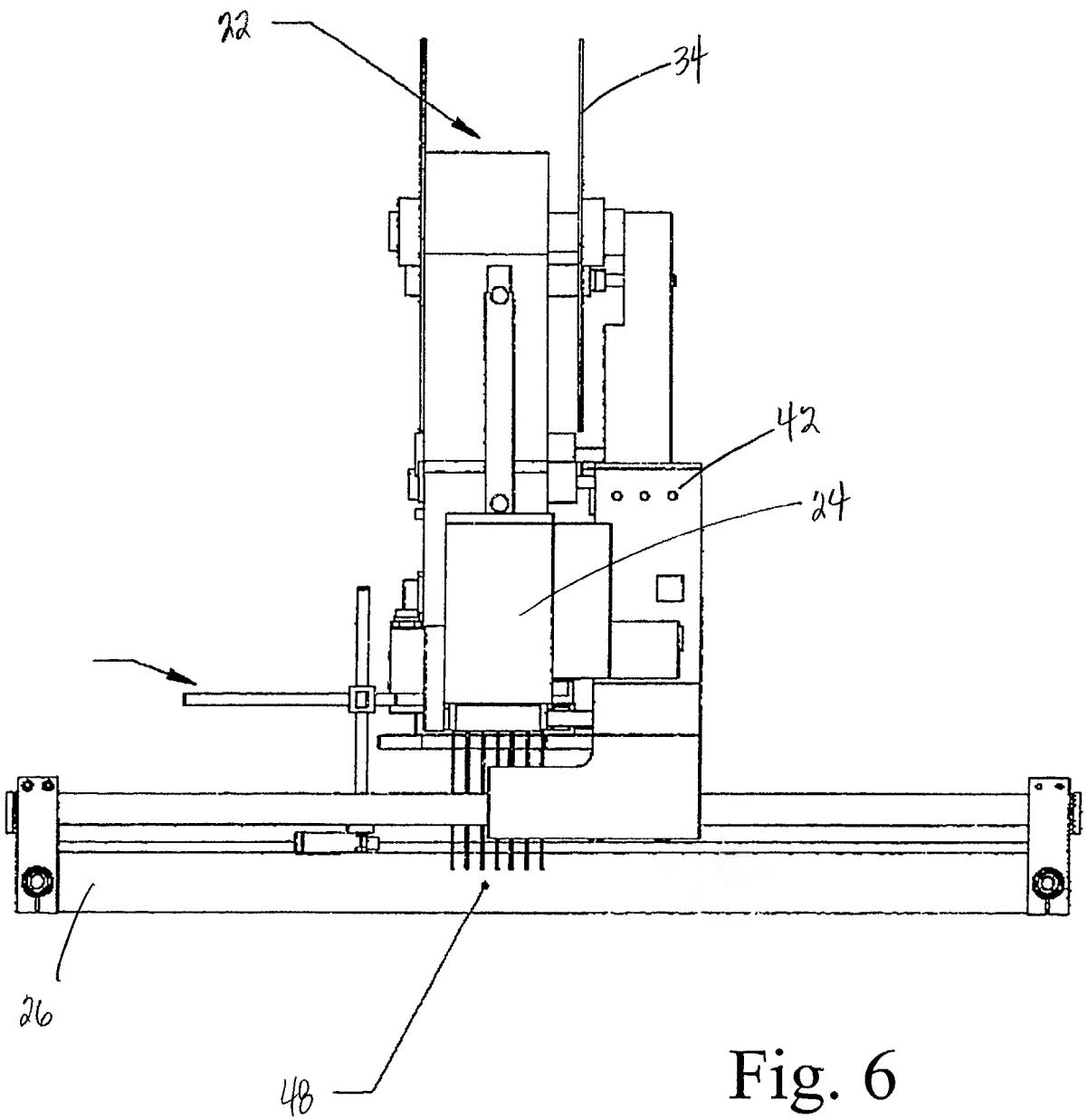

Fig. 6

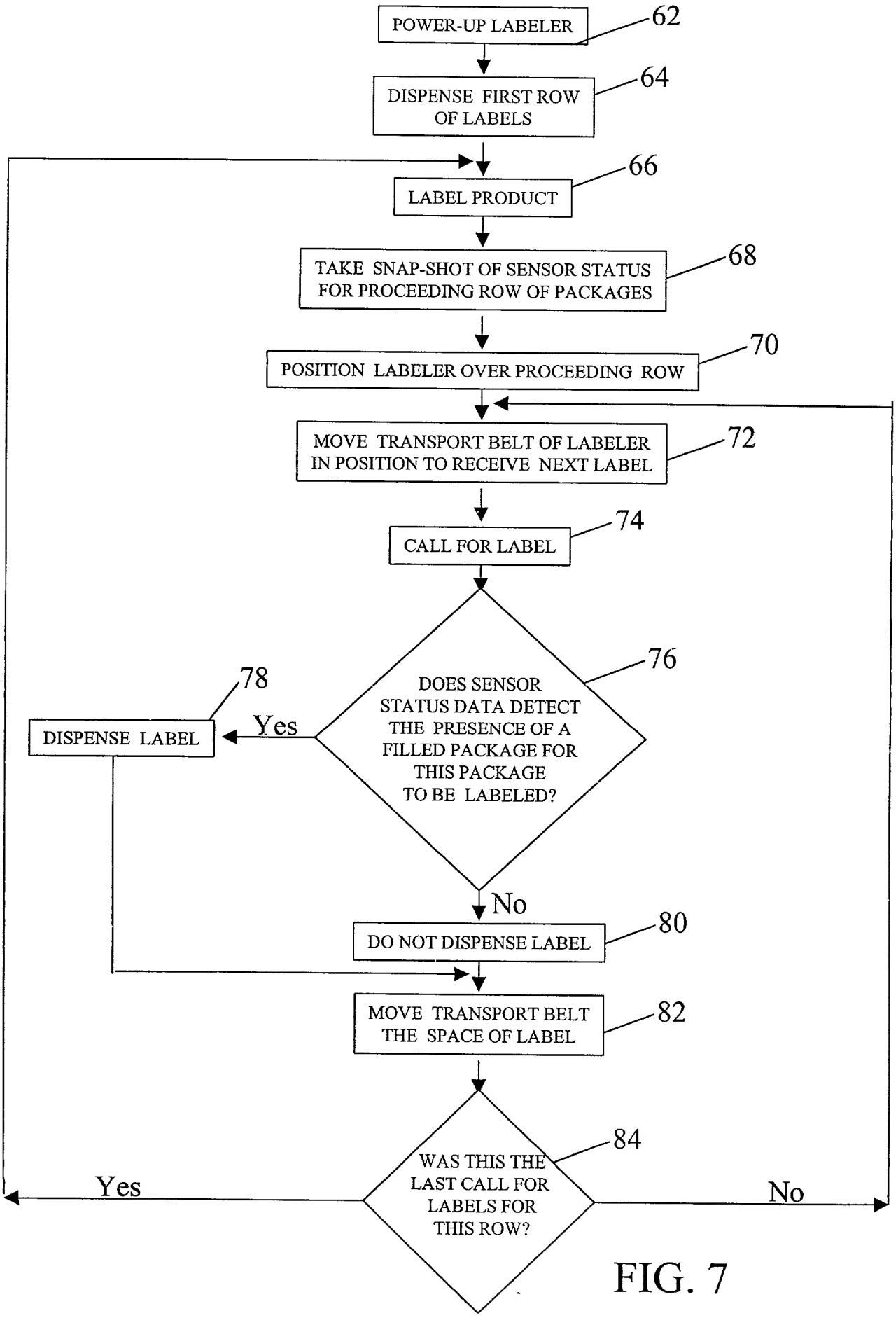
POWER-UP LABELER
62
DISPENSE FIRST ROW OF LABELS
64
LABEL PRODUCT
66
TAKE SNAP-SHOT OF SENSOR STATUS FOR PROCEEDING ROW OF PACKAGES
68
POSITION LABELER OVER PROCEEDING ROW
70
MOVE TRANSPORT BELT OF LABELER IN POSITION TO RECEIVE NEXT LABEL
72
CALL FOR LABEL
74
DOES SENSOR STATUS DATA DETECT THE PRESENCE OF A FILLED PACKAGE FOR THIS PACKAGE TO BE LABELED?
76
Yes
78
DISPENSE LABEL
No
DO NOT DISPENSE LABEL
80
MOVE TRANSPORT BELT THE SPACE OF LABEL
82
WAS THIS THE LAST CALL FOR LABELS FOR THIS ROW?
84
Yes
No

FIG. 7

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare:

That my residence, post office address and citizenship are as stated below next to my name.

That I verily believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

EMPTY PACKAGE DETECTOR FOR LABELING APPARATUS

the specification of which (check one)

☒ is attached hereto.
☐ was filed on: _____ as
☐ Application Serial No.: _____
and was amended on: _____

That I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

That I acknowledge the duty to disclose information known to be material to patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

That I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

(Number)	(Country)	(Day/Month/Year Filed)	Priority Claimed Yes	No
			☐	☐
			☐	☐

Prior United States Provisional Application(s)

That I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

(Application Number)	(Filing Date)

Prior United States Application(s)

That I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status)-(Patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status)-(Patented, pending, abandoned)

That all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

I hereby appoint the following attorneys, with full power of substitution and revocation, to prosecute this application and any related foreign applications and to transact all business in the United States Patent and Trademark Office connected therewith and request that all correspondence and telephone calls in respect to this application be directed to **Jennifer H. Hammond at SONNENSCHEIN, NATH & ROSENTHAL, 4520 Main Street, Suite 1100, Kansas City, MO 64111.**

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